

January 15, 2013

Mr. Jason Gunter
Remedial Project Manager
U.S. Environmental Protection Agency
Region 7 - Superfund Branch
901 North 5th Street
Kansas City, KS 66101

Re: The Doe Run Company – Elvins/Rivermines Mine Tailings Site Monthly Progress Report

Dear Mr. Gunter:

As required by Article VI, Section 56 of the Unilateral Administrative Order (UAO) (CERCLA-07-2005-0169) for the referenced project and on behalf of The Doe Run Company, the progress report for the period December 1, 2012 through December 31, 2012 is enclosed. If you have any questions or comments, please call me at 573-638-5020 or Mark Nations at 573-518-0800.

Sincerely,



Ty L. Morris, P.E., R.G.
Vice President

TLM/jms
Enclosures
c: Mark Nations – TDRC
Matt Wohl – TDRC (electronic only)
Kathy Rangen – MDNR
Tim Skoglund – Barr Engineering

OTCR

40416602

4.2



Superfund

DUOZ

Elvins/Rivermines Mine Tailings Site
Park Hills, Missouri
Removal Action - Monthly Progress Report
Period: December 1, 2012 – December 31, 2012

1. Actions Performed and Problems Encountered This Period:

- a. Continued operating the roughing filter during the period and divert flow around the ZVI/sand filter, aeration tank, and final sand filter.
- b. Continued to take analytical samples from the pilot test roughing filter (RMP-Rough) during the period. Samples were taken one to three times a week. These samples were taken from the syphon hose except for the sampling events on December 3, 2012, December 7, 2012, December 10, 2012, and December 14, 2012 when the samples were taken from the bypass pipe. Analytical results are described below and included with this progress report.
- c. Continued to have head loss issues within the roughing filter and its associated piping system. This is primarily occurring as a result of the metal sulfides that have been deposited in the system as a result of the treatment process. During the month of December, head losses due to metal sulfide deposits did not seem to increase.
- d. Continued efforts to bench test possible renovations to the iron/sand filter and system piping.
- e. Vandalism occurred at the pilot test during the month of December. This included someone dropping a bucket into the seepage pond outlet on or around December 4, 2012, which subsequently increased the flow rate through the pilot and caused overtopping in the roughing filter. In addition, on or around December 12, 2012, the seepage pond outlet to the treatment pond was blocked with soil/aggregate, and the roughing filter inlet pipe was destroyed, subsequently ceasing flow through the pilot test. Flow to the pilot test was restored on December 13, 2012.
- f. Work continued on the task of rehabilitating the western treatment pond. This work focused on allowing the saturated media to activate. As part of the media activation process, the flow was resumed in mid-December at a low rate. The flow rate will be progressively increased over the next several months.

2. Analytical Data and Results Received This Period:

- a. Dissolved zinc levels in the pilot effluent test ranged between 3.92 mg/L and 9.10 mg/L.
- b. Total zinc levels in the pilot test effluent ranged between 5.62 mg/L and 10.04 mg/L.
- c. Iron concentrations in the pilot test effluent ranged between 1.07 mg/L and 4.32 mg/L.
- d. Total suspended solids concentrations in the system effluent were not measured this period.
- e. During this period, water samples were collected from just upstream of Old Missouri Highway 32, as well as from upstream and downstream of the confluence of the site discharge with Flat River. The analytical results for this event are included in this progress report.
- f. During this period, the Ambient Air Monitoring Report for September 2012 was received. Any issues identified in this report are discussed below. A copy of this document has been sent to your attention.

The September 2012 Ambient Air Monitoring Report noted the following:

- The action levels for lead and dust were not exceeded.
- No samples were taken with the TSP and PM₁₀ monitors on 09/03/12 due to the holiday.
- No samples were taken with the Big River #4 (Primary) PM₁₀ monitor on 09/21/12 due to mechanical failure. Upon discovery, the issue was corrected.

- No samples were taken with the Rivermines #1 (Office) TSP and PM₁₀ monitors on 09/27/12 due to electrical issues caused by the weather. Upon discovery, the issues were corrected.
- There was a QA blank filter associated with the Rivermines #2 (North) TSP and PM₁₀ monitors on 09/28/12.

3. Developments Anticipated and Work Scheduled for Next Period:

- a. Continue analytical sampling and field measurements three times a week. No WET tests are planned.
- b. Continue to operate the system with the bypass pipe.
- c. Complete monthly water sampling activities as described in the Removal Action Work Plan.
- d. Complete air monitoring activities as described in the Removal Action Work Plan.
- e. Continue bench testing secondary treatment options that could be added to the roughing filter of the pilot test.
- f. Continue renovations to the western treatment pond. This work will focus on progressively increasing the flow rate over the next several months and monitoring the system to see that the hydraulics are working properly.

4. Changes in Personnel:

- a. None.

5. Issues or Problems Arising This Period:

- a. None.

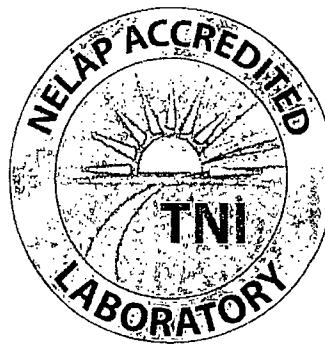
6. Resolution of Issues or Problems Arising This Period:

- a. None.

End of Monthly Progress Report

December 26, 2012

Allison Olds
Barr Engineering Company
1001 Diamond Ridge
Suite 1100
Jefferson City, MO 65109
TEL: (573) 638-5007
FAX: (573) 638-5001



RE: Rivermines NPDES

WorkOrder: 12120699

Dear Allison Olds:

TEKLAB, INC received 4 samples on 12/13/2012 12:05:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,



Elizabeth A. Hurley
Project Manager
(618)344-1004 ex 33
ehurley@teklabinc.com

Client: Barr Engineering Company

Work Order: 12120699

Client Project: Rivermines NPDES

Report Date: 26-Dec-12

This reporting package includes the following:

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Definitions

<http://www.teklabinc.com/>

Client: Barr Engineering Company
Client Project: Rivermines NPDES

Work Order: 12120699
Report Date: 26-Dec-12

Abbr Definition

- CCV Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
- DF Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
- DNI Did not ignite
- DUP Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
- ICV Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
- IDPH IL Dept. of Public Health
- LCS Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
- LCSD Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
- MB Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
- MDL Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.
- MS Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
- MSD Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
- MW Molecular weight
- ND Not Detected at the Reporting Limit
- NELAP NELAP Accredited
- PQL Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
- RL The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
- RPD Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
- SPK The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
- Surrogate Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
- TNTC Too numerous to count (> 200 CFU)

Qualifiers

- | | |
|--|--|
| # - Unknown hydrocarbon | B - Analyte detected in associated Method Blank |
| E - Value above quantitation range | H - Holding times exceeded |
| J - Analyte detected below quantitation limits | M - Manual Integration used to determine area response |
| ND - Not Detected at the Reporting Limit | R - RPD outside accepted recovery limits |
| S - Spike Recovery outside recovery limits | X - Value exceeds Maximum Contaminant Level |

Client: Barr Engineering Company

Work Order: 12120699

Client Project: Rivermines NPDES

Report Date: 26-Dec-12

Cooler Receipt Temp: 5.0 °C

Locations and Accreditations

Collinsville		Springfield		Kansas City	
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	Address	3920 Pintail Dr Springfield, IL 62711-9415	Address	8421 Nieman Road Lenexa, KS 66214
Phone	(618) 344-1004	Phone	(217) 698-1004	Phone	(913) 541-1998
Fax	(618) 344-1005	Fax	(217) 698-1005	Fax	(913) 541-1998
Email	jhriley@teklabinc.com	Email	KKlostermann@teklabinc.com	Email	dthompson@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2013	Collinsville
Kansas	KDHE	E-10374	NELAP	1/31/2013	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2013	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2013	Springfield
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2013	Collinsville
Arkansas	ADEQ	88-0966		3/14/2013	Collinsville
Illinois	IDPH	17584		4/30/2013	Collinsville
Kentucky	UST	0073		5/26/2013	Collinsville
Missouri	MDNR	00930		4/13/2013	Collinsville
Oklahoma	ODEQ	9978		8/31/2013	Collinsville

Laboratory Results

<http://www.teklabinc.com/>
Client: Barr Engineering Company

Work Order: 12120699

Client Project: Rivermines NPDES

Report Date: 26-Dec-12

Lab ID: 12120699-001

Client Sample ID: RM-001

Matrix: AQUEOUS

Collection Date: 12/12/2012 12:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	1000	S	1020	mg/L	100	12/20/2012 18:36	R171905
<i>Matrix interference present in sample.</i>								
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.29		1	12/14/2012 13:09	R171621
STANDARD METHODS 2340 C								
Hardness, as (CaCO ₃)	NELAP	5		1200	mg/L	1	12/14/2012 7:48	R171594
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		< 6	mg/L	1	12/14/2012 16:24	R171644
STANDARD METHODS 2540 F								
Solids, Settleable	NELAP	0.1		0.2	ml/L	1	12/13/2012 17:49	R171553
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	10		40.4	mg/L	10	12/17/2012 16:45	R171703
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		8.80	µg/L	1	12/15/2012 0:01	84205
Zinc	NELAP	10.0		15700	µg/L	1	12/15/2012 0:01	84205
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		13.3	µg/L	1	12/14/2012 19:55	84207
Zinc	NELAP	10.0	S	16500	µg/L	1	12/14/2012 19:55	84207
<i>MS QC limits for Zn are not applicable due to high sample/spike ratio.</i>								
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	4.00	X	20.6	µg/L	2	12/14/2012 10:58	84203
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	4.00	X	17.4	µg/L	2	12/14/2012 14:02	84204

Client: Barr Engineering Company

Work Order: 12120699

Client Project: Rivermines NPDES

Report Date: 26-Dec-12

Lab ID: 12120699-002

Client Sample ID: RM-US

Matrix: AQUEOUS

Collection Date: 12/12/2012 11:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	20		45	mg/L	2	12/21/2012 21:21	R171945
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.97		1	12/13/2012 15:31	R171558
STANDARD METHODS 2340 C								
Hardness, as (CaCO ₃)	NELAP	5		250	mg/L	1	12/14/2012 7:48	R171594
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		< 6	mg/L	1	12/14/2012 16:24	R171644
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		2.0	mg/L	1	12/14/2012 16:05	R171662
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		< 2.00	µg/L	1	12/15/2012 0:19	84205
Zinc	NELAP	10.0		< 10.0	µg/L	1	12/15/2012 0:19	84205
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		< 2.00	µg/L	1	12/14/2012 20:13	84207
Zinc	NELAP	10.0		< 10.0	µg/L	1	12/14/2012 20:13	84207
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00		< 2.00	µg/L	1	12/14/2012 11:09	84203
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00		< 2.00	µg/L	1	12/14/2012 13:48	84204

Laboratory Results

<http://www.teklabinc.com/>
Client: Barr Engineering Company

Work Order: 12120699

Client Project: Rivermines NPDES

Report Date: 26-Dec-12

Lab ID: 12120699-003

Client Sample ID: RM-DS

Matrix: AQUEOUS

Collection Date: 12/12/2012 11:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	200		250	mg/L	20	12/20/2012 19:00	R171905
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.88		1	12/13/2012 15:34	R171558
STANDARD METHODS 2340 C								
Hardness, as (CaCO ₃)	NELAP	5		480	mg/L	1	12/14/2012 7:48	R171594
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		< 6	mg/L	1	12/14/2012 16:24	R171644
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		5.7	mg/L	1	12/14/2012 16:12	R171662
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		< 2.00	µg/L	1	12/15/2012 0:37	84205
Zinc	NELAP	10.0		2760	µg/L	1	12/15/2012 0:37	84205
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		< 2.00	µg/L	1	12/14/2012 20:19	84207
Zinc	NELAP	10.0		3060	µg/L	1	12/14/2012 20:19	84207
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00		4.74	µg/L	1	12/14/2012 10:35	84203
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00		4.74	µg/L	1	12/14/2012 13:52	84204

Client: Barr Engineering Company

Work Order: 12120699

Client Project: Rivermines NPDES

Report Date: 26-Dec-12

Lab ID: 12120699-004

Client Sample ID: RM-Dup

Matrix: AQUEOUS

Collection Date: 12/12/2012 0:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	200		987	mg/L	20	12/20/2012 19:21	R171905
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.31		1	12/14/2012 13:11	R171621
STANDARD METHODS 2340 C								
Hardness, as (CaCO ₃)	NELAP	5		1200	mg/L	1	12/14/2012 7:48	R171594
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		6	mg/L	1	12/14/2012 16:44	R171644
STANDARD METHODS 2540 F								
Solids, Settleable	NELAP	0.1		0.3	ml/L	1	12/13/2012 17:49	R171553
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	10		40.0	mg/L	10	12/17/2012 16:51	R171703
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		8.80	µg/L	1	12/15/2012 0:43	84205
Zinc	NELAP	10.0		15600	µg/L	1	12/15/2012 0:43	84205
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		13.6	µg/L	1	12/14/2012 20:25	84207
Zinc	NELAP	10.0		16800	µg/L	1	12/14/2012 20:25	84207
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00	X	21.4	µg/L	1	12/14/2012 10:38	84203
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00	X	16.6	µg/L	1	12/14/2012 13:55	84204

Sample Summary

<http://www.teklabinc.com/>

Client: Barr Engineering Company

Work Order: 12120699

Client Project: Rivermines NPDES

Report Date: 26-Dec-12

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
12120699-001	RM-001	Aqueous	5	12/12/2012 12:05
12120699-002	RM-US	Aqueous	5	12/12/2012 11:50
12120699-003	RM-DS	Aqueous	5	12/12/2012 11:30
12120699-004	RM-Dup	Aqueous	5	12/12/2012 0:00

Client: Barr Engineering Company

Work Order: 12120699

Client Project: Rivermines NPDES

Report Date: 26-Dec-12

Sample ID	Client Sample ID	Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
12120699-001A	RM-001	Standard Methods 2540 F	12/12/2012 12:05	12/13/2012 12:05		12/13/2012 17:49
12120699-001B	RM-001	EPA 600 375.2 Rev 2.0 1993 (Total)	12/12/2012 12:05	12/13/2012 12:05		12/20/2012 18:36
		Standard Method 4500-H B, Laboratory Analyzed				12/14/2012 13:09
		Standard Methods 2340 C				12/14/2012 7:48
		Standard Methods 2540 D				12/14/2012 16:24
12120699-001C	RM-001	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)	12/12/2012 12:05	12/13/2012 12:05	12/13/2012 15:48	12/14/2012 19:55
		Standard Methods 3030 E, 3113 B, Metals by GFAA			12/13/2012 15:10	12/14/2012 10:58
12120699-001D	RM-001	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)	12/12/2012 12:05	12/13/2012 12:05	12/13/2012 16:45	12/15/2012 0:01
		Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			12/13/2012 15:05	12/14/2012 14:02
12120699-001E	RM-001	Standard Methods 5310 C, Organic Carbon	12/12/2012 12:05	12/13/2012 12:05		12/17/2012 16:45
12120699-002A	RM-US	Standard Method 4500-H B, Laboratory Analyzed	12/12/2012 11:50	12/13/2012 12:05		12/13/2012 15:31
		Standard Methods 2540 D				12/14/2012 16:24
12120699-002B	RM-US	EPA 600 375.2 Rev 2.0 1993 (Total)	12/12/2012 11:50	12/13/2012 12:05		12/21/2012 21:21
		Standard Methods 2340 C				12/14/2012 7:48
12120699-002C	RM-US	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)	12/12/2012 11:50	12/13/2012 12:05	12/13/2012 15:48	12/14/2012 20:13
		Standard Methods 3030 E, 3113 B, Metals by GFAA			12/13/2012 15:10	12/14/2012 11:09
12120699-002D	RM-US	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)	12/12/2012 11:50	12/13/2012 12:05	12/13/2012 16:45	12/15/2012 0:19
		Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			12/13/2012 15:45	12/14/2012 13:48
12120699-002E	RM-US	Standard Methods 5310 C, Organic Carbon	12/12/2012 11:50	12/13/2012 12:05		12/14/2012 16:05
12120699-003A	RM-DS	Standard Method 4500-H B, Laboratory Analyzed	12/12/2012 11:30	12/13/2012 12:05		12/13/2012 15:34
		Standard Methods 2540 D				12/14/2012 16:24
12120699-003B	RM-DS	EPA 600 375.2 Rev 2.0 1993 (Total)	12/12/2012 11:30	12/13/2012 12:05		12/20/2012 19:00
		Standard Methods 2340 C				12/14/2012 7:48
12120699-003C	RM-DS		12/12/2012 11:30	12/13/2012 12:05		

Dates Report

<http://www.teklabinc.com/>
Client: Barr Engineering Company

Work Order: 12120699

Client Project: Rivermines NPDES

Report Date: 26-Dec-12

Sample ID	Client Sample ID	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	Test Name				
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			12/13/2012 15:48	12/14/2012 20:19
	Standard Methods 3030 E, 3113 B, Metals by GFAA			12/13/2012 15:10	12/14/2012 10:35
12120699-003D	RM-DS	12/12/2012 11:30	12/13/2012 12:05		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			12/13/2012 16:45	12/15/2012 0:37
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			12/13/2012 15:45	12/14/2012 13:52
12120699-003E	RM-DS	12/12/2012 11:30	12/13/2012 12:05		
	Standard Methods 5310 C, Organic Carbon				12/14/2012 16:12
12120699-004A	RM-Dup	12/12/2012 0:00	12/13/2012 12:05		
	Standard Methods 2540 F				12/13/2012 17:49
12120699-004B	RM-Dup	12/12/2012 0:00	12/13/2012 12:05		
	EPA 600 375.2 Rev 2.0 1993 (Total)				12/20/2012 19:21
	Standard Method 4500-H B, Laboratory Analyzed				12/14/2012 13:11
	Standard Methods 2340 C				12/14/2012 7:48
	Standard Methods 2540 D				12/14/2012 16:44
12120699-004C	RM-Dup	12/12/2012 0:00	12/13/2012 12:05		
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			12/13/2012 15:48	12/14/2012 20:25
	Standard Methods 3030 E, 3113 B, Metals by GFAA			12/13/2012 15:10	12/14/2012 10:38
12120699-004D	RM-Dup	12/12/2012 0:00	12/13/2012 12:05		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			12/13/2012 16:45	12/15/2012 0:43
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			12/13/2012 15:45	12/14/2012 13:55
12120699-004E	RM-Dup	12/12/2012 0:00	12/13/2012 12:05		
	Standard Methods 5310 C, Organic Carbon				12/17/2012 16:51

Client: Barr Engineering Company

Work Order: 12120699

Client Project: Rivermines NPDES

Report Date: 26-Dec-12

EPA 600 375.2 REV 2.0 1993 (TOTAL)

Batch R171678 SampType: MBLK		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
SampID: MBLK													
Sulfate		10					< 10						12/14/2012
Batch R171678 SampType: LCS		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
SampID: LCS													
Sulfate		10					22	20	0	108.2	90	110	12/14/2012
Batch R171905 SampType: MBLK		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
SampID: MBLK													
Sulfate		10					< 10						12/20/2012
Batch R171905 SampType: LCS		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
SampID: LCS													
Sulfate		10					22	20	0	108.9	90	110	12/20/2012
Batch R171905 SampType: MS		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
SampID: 12120699-001BMS													
Sulfate		1000	S				1860	1000	1024	84.0	90	110	12/20/2012
Batch R171905 SampType: MSD		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
SampID: 12120699-001BMSD													
Sulfate		1000					1930	1000	1024	90.8	1864	3.58	12/20/2012
Batch R171945 SampType: MBLK		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
SampID: MBLK													
Sulfate		10					< 10						12/21/2012
Batch R171945 SampType: LCS		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
SampID: LCS													
Sulfate		10					22	20	0	108.0	90	110	12/21/2012

Quality Control Results

<http://www.teklabinc.com/>
Client: Barr Engineering Company

Work Order: 12120699

Client Project: Rivermines NPDES

Report Date: 26-Dec-12

STANDARD METHOD 4500-H B, LABORATORY ANALYZED

Batch R171558 SampType: LCS		Units		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
SampID: LCS													
Lab pH		1.00					7.01	7.00	0	100.1	99.1	100.8	12/13/2012

Batch R171558 SampType: DUP		Units		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
SampID: 12120699-002ADUP													
Lab pH		1.00					7.96				7.970	0.13	12/13/2012

Batch R171558 SampType: DUP		Units		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
SampID: 12120699-003ADUP													
Lab pH		1.00					7.92				7.880	0.51	12/13/2012

Batch R171621 SampType: LCS		Units		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
SampID: LCS													
Lab pH		1.00					6.99	7.00	0	99.9	99.1	100.8	12/14/2012

Batch R171621 SampType: DUP		Units		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
SampID: 12120699-001BDUP													
Lab pH		1.00					7.30				7.290	0.14	12/14/2012

Batch R171621 SampType: DUP		Units		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
SampID: 12120699-004BDUP													
Lab pH		1.00					7.30				7.310	0.14	12/14/2012

STANDARD METHODS 2340 C		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
SampID: MBLK-R171594													
Hardness, as (CaCO ₃)		5					< 5						12/14/2012

Batch R171594 SampType: LCS		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
SampID: LCS-R171594													
Hardness, as (CaCO ₃)		5					1000	1000	0	100	90	110	12/14/2012

Quality Control Results

<http://www.teklabinc.com/>

Client: Barr Engineering Company

Work Order: 12120699

Client Project: Rivermines NPDES

Report Date: 26-Dec-12

STANDARD METHODS 2340 C

Batch	R171594	SampType:	MS	Units	mg/L						Date Analyzed
SampID:	12120699-004BMS										
Analyses		RL	Qual	Result	Spike	SPK	Ref Val	%REC	Low Limit	High Limit	
Hardness, as (CaCO ₃)		5		1400	200	1200	100		85	115	12/14/2012

Batch	R171594	SampType:	MSD	Units	mg/L						RPD Limit 10	Date Analyzed
SampID:	12120699-004BMSD											
Analyses		RL	Qual	Result	Spike	SPK	Ref Val	%REC	RPD Ref Val	%RPD		
Hardness, as (CaCO ₃)		5		1410	200	1200	105.0		1400	0.71	12/14/2012	

STANDARD METHODS 2540 D

Batch	R171644	SampType:	MBLK	Units	mg/L						Date Analyzed
SampID:	MBLK										
Analyses		RL	Qual	Result	Spike	SPK	Ref Val	%REC	Low Limit	High Limit	
Total Suspended Solids		6		< 6							12/14/2012

Batch	R171644	SampType:	LCS	Units	mg/L						Date Analyzed
SampID:	LCS										
Analyses		RL	Qual	Result	Spike	SPK	Ref Val	%REC	Low Limit	High Limit	
Total Suspended Solids		6		104	100	0	104.0		85	115	12/14/2012
Total Suspended Solids		6		93	100	0	93.0		85	115	12/14/2012
Total Suspended Solids		6		100	100	0	100		85	115	12/14/2012

Batch	R171644	SampType:	DUP	Units	mg/L						RPD Limit 15	Date Analyzed
SampID:	12120699-003A DUP											
Analyses		RL	Qual	Result	Spike	SPK	Ref Val	%REC	RPD Ref Val	%RPD		
Total Suspended Solids		6		< 6					0	0.00	12/14/2012	

STANDARD METHODS 5310 C, ORGANIC CARBON

Batch	R171662	SampType:	MBLK	Units	mg/L						Date Analyzed
SampID:	MB-R171662										
Analyses		RL	Qual	Result	Spike	SPK	Ref Val	%REC	Low Limit	High Limit	
Total Organic Carbon (TOC)		1.0		< 1.0							12/14/2012

Batch	R171662	SampType:	LCS	Units	mg/L						Date Analyzed
SampID:	LCS-R171662										
Analyses		RL	Qual	Result	Spike	SPK	Ref Val	%REC	Low Limit	High Limit	
Total Organic Carbon (TOC)		10		63.2	59.7	0	105.8		90	110	12/14/2012

Batch	R171703	SampType:	MBLK	Units	mg/L						Date Analyzed
SampID:	MBLK										
Analyses		RL	Qual	Result	Spike	SPK	Ref Val	%REC	Low Limit	High Limit	
Total Organic Carbon (TOC)		1.0		< 1.0							12/17/2012

Quality Control Results

<http://www.teklabinc.com/>
Client: Barr Engineering Company

Work Order: 12120699

Client Project: Rivermines NPDES

Report Date: 26-Dec-12

STANDARD METHODS 5310 C, ORGANIC CARBON
Batch R171703 SampType: LCS Units mg/L

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)	10		62.3	59.7	0	104.4	90	110	12/17/2012

Batch R171703 SampType: MS Units mg/L

SampID: 12120699-004EMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)	10		84.9	50.0	40.04	89.7	85	115	12/17/2012

Batch R171703 SampType: MSD Units mg/L

SampID: 12120699-004EMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Organic Carbon (TOC)	10		84.3	50.0	40.04	88.6	84.91	0.67	12/17/2012

EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)
Batch 84205 SampType: MBLK Units µg/L

SampID: MB-84205

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		< 2.00	2.00	0	0	-100	100	12/14/2012
Zinc	10.0		< 10.0	10.0	0	0	-100	100	12/14/2012

Batch 84205 SampType: LCS Units µg/L

SampID: LCS-84205

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		45.7	50.0	0	91.4	85	115	12/14/2012
Zinc	10.0		478	500	0	95.7	85	115	12/14/2012

Batch 84205 SampType: MS Units µg/L

SampID: 12120699-002DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		42.5	50.0	0	85.0	75	125	12/15/2012
Zinc	10.0		456	500	4.4	90.4	75	125	12/15/2012

Batch 84205 SampType: MSD Units µg/L

SampID: 12120699-002DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cadmium	2.00		42.5	50.0	0	85.0	42.5	0.00	12/15/2012
Zinc	10.0		457	500	4.4	90.5	456.2	0.15	12/15/2012

Client: Barr Engineering Company

Work Order: 12120699

Client Project: Rivermines NPDES

Report Date: 26-Dec-12

EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)

Batch	84207	SampType:	MBLK	Units	µg/L					Date Analyzed
SampID:	MB-84207									
Analyses		RL	Qual			Result	Spike	SPK Ref Val	%REC	
Cadmium		2.00				< 2.00	2.00	0	0	-100 100 12/14/2012
Zinc		10.0				< 10.0	10.0	0	0	-100 100 12/14/2012

Batch 84207 SampType: LCS Units µg/L

Batch	84207	SampType:	LCS	Units	µg/L					Date Analyzed
SampID:	LCS-84207									
Analyses		RL	Qual			Result	Spike	SPK Ref Val	%REC	
Cadmium		2.00				48.9	50.0	0	97.8	85 115 12/14/2012
Zinc		10.0				515	500	0	103.0	85 115 12/14/2012

Batch 84207 SampType: MS Units µg/L

Batch	84207	SampType:	MS	Units	µg/L					Date Analyzed
SampID:	12120699-001CMS									
Analyses		RL	Qual			Result	Spike	SPK Ref Val	%REC	
Cadmium		2.00				58.6	50.0	13.3	90.6	75 125 12/14/2012
Zinc		10.0	S			17200	500	16530	130.0	75 125 12/14/2012

Batch 84207 SampType: MSD Units µg/L RPD Limit 20

Batch	84207	SampType:	MSD	Units	µg/L					Date Analyzed
SampID:	12120699-001CMSD									
Analyses		RL	Qual			Result	Spike	SPK Ref Val	%REC	
Cadmium		2.00				58.3	50.0	13.3	90.0	58.6 0.51 12/14/2012
Zinc		10.0	S			16800	500	16530	46.0	17180 2.47 12/14/2012

STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA

Batch	84203	SampType:	MBLK	Units	µg/L					Date Analyzed
SampID:	MB-84203									
Analyses		RL	Qual			Result	Spike	SPK Ref Val	%REC	
Lead		2.00				< 2.00	2.00	0	0	-100 100 12/14/2012

Batch 84203 SampType: LCS Units µg/L

Batch	84203	SampType:	LCS	Units	µg/L					Date Analyzed
SampID:	LCS-84203									
Analyses		RL	Qual			Result	Spike	SPK Ref Val	%REC	
Lead		2.00				14.4	15.0	0	96.2	85 115 12/14/2012

Batch 84203 SampType: MS Units µg/L

Batch	84203	SampType:	MS	Units	µg/L					Date Analyzed
SampID:	12120699-001CMS									
Analyses		RL	Qual			Result	Spike	SPK Ref Val	%REC	
Lead		4.00				34.1	15.0	20.6406	89.8	70 130 12/14/2012

Batch 84203 SampType: MSD Units µg/L RPD Limit 20

Batch	84203	SampType:	MSD	Units	µg/L					Date Analyzed
SampID:	12120699-001CMSD									
Analyses		RL	Qual			Result	Spike	SPK Ref Val	%REC	
Lead		4.00				34.0	15.0	20.6406	88.7	34.1142 0.48 12/14/2012

Client: Barr Engineering Company

Work Order: 12120699

Client Project: Rivermines NPDES

Report Date: 26-Dec-12

STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)

Batch 84204 SampType: MBLK		Units µg/L								Date Analyzed
Analyses		RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	
Lead		2.00		< 2.00	2.00	0	0	-100	100	12/14/2012
<hr/>										
Batch 84204 SampType: LCS	Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
LCS-84204	Lead	2.00		14.3	15.0	0	95.5	85	115	12/17/2012
<hr/>										
Batch 84204 SampType: MS	Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
12120699-001DMS	Lead	4.00		30.1	15.0	17.3618	85.2	70	130	12/14/2012
<hr/>										
Batch 84204 SampType: MSD	Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Limit 20		
12120699-001DMSD	Lead	4.00		30.7	15.0	17.3618	88.6	30.142	1.69	12/14/2012
<hr/>										

Receiving Check List

<http://www.teklabinc.com/>

Client: Barr Engineering Company

Work Order: 12120699

Client Project: Rivermines NPDES

Report Date: 26-Dec-12

Carrier: Neil Talbott

Received By: SRH

Completed by:

On:

13-Dec-12



Timothy W. Mathis

Reviewed by:

On:

13-Dec-12



Michael L. Austin

Pages to follow:

Chain of custody

1

Extra pages included

0

Shipping container/cooler in good condition?

Yes

No

Not Present

Temp °C 5.0

Type of thermal preservation?

None

Ice

Blue Ice

Dry Ice

Chain of custody present?

Yes

No

Chain of custody signed when relinquished and received?

Yes

No

Chain of custody agrees with sample labels?

Yes

No

Samples in proper container/bottle?

Yes

No

Sample containers intact?

Yes

No

Sufficient sample volume for indicated test?

Yes

No

All samples received within holding time?

Yes

No

Reported field parameters measured:

Field

Lab

NA

Container/Temp Blank temperature in compliance?

Yes

No

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?

Yes

No

No VOA vials

Water - TOX containers have zero headspace?

Yes

No

No TOX containers

Water - pH acceptable upon receipt?

Yes

No

NPDES/CWA TCN interferences checked/treated in the field?

Yes

No

NA

Any No responses must be detailed below or on the COC.



Chain of Custody

1001 Diamond Ridge, Suite 1100
Jefferson City, MO 65109
(573) 638-5000

Project Number: 25860009.00 TLM 021

Project Name: Rivermines NPDES

Sample Origination State: MO (use two letter postal state abbreviation)

COC Number: DRC RM NPDES

RMP121212

Location	Start Depth	Stop Depth	Depth Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix		Type		pH	Parameters				Total Number of Containers								
						Water	Soil	Grab	Comp		Total Suspended Solids	Sulfate	Sedimentable Solids	Total Organic Carbon	Total Metals	Dissolved Metals	Hardness	VOCs (tared MeOH) #1	GRO, BTE (tared MeOH) #1	DRO (tared unpreserved)	Metals (unpreserved) #2	SVOCs (unpreserved) #2	% Solids (plastic vial, unpres.)
1. RM-001	001			12/12/12	12:05	x		x		x	x	x	x	x	x	x						5	Preservatives: 2 HNO3, 1 H2SO4, 2 Unpreserved
2. RM-US	002				11:50	x		x		x	x	x	x	x	x	x						5	Preservatives: 2 HNO3, 1 H2SO4, 2 Unpreserved
3. RM-DS	003				11:30	x		x		x	x	x	x	x	x	x						5	Preservatives: 2 HNO3, 1 H2SO4, 2 Unpreserved
4. RM-DUP	004				11:45	x		x		x	x	x	x	x	x	x						5	Preservatives: 2 HNO3, 1 H2SO4, 2 Unpreserved
5.																							
6.																							
7.																							
8.																							

Comments: Invoice to Mark Nations at Doe Run. Results to be sent to Allison Olds (aolds@barr.com) at Barr Engineering, Andrea Nord (anord@barr.com) at Barr Engineering, and Mark Nations (mnations@doerun.com) at Doe Run.

Matrix is surface water.

Metals include Cadmium, Lead, and Zinc.

Common Parameter/Container – Preservation Key

#1 – Volatile Organics = BTEX, GRO, TPH, 8260 Full List

#2 – Semivolatile Organics = PAHs, PCP, Dioxins, 8270 Full List, Herbicide/Pesticide, PCBs

#3 – General = pH, Chloride, Fluoride, Alkalinity, TSS, TDS, TS, Sulfate

#4 – Nutrients = COD, TOC, Phenols, Ammonia Nitrogen, TKN

Relinquished By: <i>Stephen Moilanen</i> Stephen Moilanen	On Ice? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	Date: 12/12/12	Time: 14:00	Received by: <i>Mark Nations</i>	Date: 12/12/12	Time: 10:15
Relinquished By: <i>Mark Nations</i>	On Ice? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	Date: 12/13/12	Time: 12:45	Received by: <i>Stephen Moilanen</i>	Date: 12/13/12	Time: 12:05
Samples Shipped VIA: <input type="checkbox"/> Air Freight <input type="checkbox"/> Federal Express <input type="checkbox"/> Sampler <input checked="" type="checkbox"/> Other: <i>Courier pickup @ DRC Federal Office</i>				Air Bill Number: 5.0 ICE		

Distribution: White – Original Accompanies Shipment to Lab; Yellow – Field Copy; Pink – Lab Coordinator

12120699

COC 1 of 1

Project Manager: Ty Morris

Project QC Contact: Andrea Nord

Sampled By: Stephen Moilanen

Laboratory: Teklab

PRES ✓ SP4
12/13/12

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
12/3/12	12-7441	RMP ROUGH T	1.8 J	5618^	1.7	0.18 J	390	26	2298	193	867	7.11	0
		RMP ROUGH D		3917					2044				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L12-0001-7441

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	12/5/12	
Copper	ug/L	3.7	0.97	12/5/12	
Lead	ug/L	ND	2.7	12/5/12	
Zinc	ug/L	0.19	0.91	12/5/12	
Nickel	ug/L	0.29	0.86	12/5/12	
Thallium	ug/L	0.08	1.86	12/5/12	
Iron	ug/L	ND	2.0	12/5/12	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	505	101%	85-115%	
Copper	ug/L	500	534	107%	85-115%	
Lead	ug/L	500	511	102%	85-115%	
Zinc	ug/L	500	509	102%	85-115%	
Nickel	ug/L	500	514	103%	85-115%	
Iron	ug/L	500	526	105%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-7441 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.31	500	500	492	498	98%	100%	75-125%	
Copper	ug/L	5.7	500	500	564	536	112%	106%	75-125%	
Lead	ug/L	0	500	500	499	506	100%	101%	75-125%	
Zinc	ug/L	56	500	500	551	545	99%	98%	75-125%	
Nickel	ug/L	4.9	500	500	505	498	100%	99%	75-125%	
Iron	ug/L	7.9	500	500	507	497	100%	98%	75-125%	



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L12-0001-7441

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.97	5	12/4/12	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	101.6	102%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	99.7	100%	85-115%	

LABORATORY SAMPLE DUPLICATE 12-7441

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	193.4	193.4	100%	85-115%	

pH SM4500-H+E

	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.00	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.00	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.01	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.06	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	4.02	3.95-4.05	L12-0002-0048

Slope 98.0% 90-102%



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAF 300.0

METHOD BLANK MATRIX: Water

Associated Lab Samples: L12-0001-7441

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	12/3/12	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 12-7441	mg/l	8.7	4	12.5	95%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.4	88%	85-115		



QUALIFIERS

Quentin J. Schmidt Analytical Laboratory

43 Iron County Road No 1 Bldg 3

Viburnum, MO 65566

(573) 244-8105

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
F	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

H Analysis conducted outside the EPA method holding time.

M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	MM
IC	TLL

Report Acceptance	
QAO	Date
GWP	12/7/2012
Manager	Date
EJS	12/7/2012

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
12/5/12	12-7524	RMP ROUGH T	ND	7832^	0.46 J	0.17 J	488	27	2979^	193	887	7.42	3
		RMP ROUGH D		5810					1990				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L12-0001-7524

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	12/6/12	
Copper	ug/L	0.72	0.97	12/6/12	
Lead	ug/L	0.82	2.7	12/6/12	
Zinc	ug/L	0.93	0.91	12/6/12	
Nickel	ug/L	ND	0.86	12/6/12	
Thallium	ug/L	ND	1.86	12/6/12	
Iron	ug/L	4.4	2.0	12/6/12	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	475	95%	85-115%	
Copper	ug/L	500	488	98%	85-115%	
Lead	ug/L	500	478	96%	85-115%	
Zinc	ug/L	500	473	95%	85-115%	
Nickel	ug/L	500	470	94%	85-115%	
Iron	ug/L	500	466	93%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-7524 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0	500	500	481	480	96%	96%	75-125%	
Copper	ug/L	0	500	500	503	492	101%	98%	75-125%	
Lead	ug/L	1.9	500	500	489	485	97%	97%	75-125%	
Zinc	ug/L	78	500	500	560	559	96%	96%	75-125%	
Nickel	ug/L	5.2	500	500	483	483	96%	96%	75-125%	
Iron	ug/L	30	500	500	494	494	93%	93%	75-125%	



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L12-0001-7524

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.67	5	12/12/12	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	99.3	99%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	97.3	97%	85-115%	

LABORATORY SAMPLE DUPLICATE 12-7524

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	193	195	101%	85-115%	

pH SM4500-H+F	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.02	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.01	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.04	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.11	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	4.02	3.95-4.05	L12-0002-0048
Slope	97.4%	90-102%	



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

METHOD BLANK MATRIX: Water

Associated Lab Samples: L12-0001-7524

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	12/7/12	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 12-7524	mg/l	8.9	4	13	103%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.6	92%	85-115		



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALIFIERS

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
FF	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

- H Analysis conducted outside the EPA method holding time.
M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	MM
IC	TLL

Report Acceptance	
QAO	Date
GWP	12/13/2012
Manager	Date
EJS	12/13/2012

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
12/7/12	12-7574	RMP ROUGH T	2.1 J	7830^	ND	0.17 J	454	25	2091	175	863	7.38	4
		RMP ROUGH D		6898^					1922				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L12-0001-7574

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.08	0.38	12/7/12	
Copper	ug/L	ND	0.97	12/7/12	
Lead	ug/L	ND	2.7	12/7/12	
Zinc	ug/L	ND	0.91	12/7/12	
Nickel	ug/L	ND	0.86	12/7/12	
Thallium	ug/L	ND	1.86	12/7/12	
Iron	ug/L	ND	2.0	12/7/12	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	492	98%	85-115%	
Copper	ug/L	500	496	99%	85-115%	
Lead	ug/L	500	490	98%	85-115%	
Zinc	ug/L	500	492	98%	85-115%	
Nickel	ug/L	500	487	97%	85-115%	
Iron	ug/L	500	477	95%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-7574 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.17	500	500	491	489	98%	98%	75-125%	
Copper	ug/L	0	500	500	494	493	99%	99%	75-125%	
Lead	ug/L	0	500	500	489	489	98%	98%	75-125%	
Zinc	ug/L	78	500	500	567	567	98%	98%	75-125%	
Nickel	ug/L	5.1	500	500	489	489	97%	97%	75-125%	
Iron	ug/L	15	500	500	527	499	102%	97%	75-125%	



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L12-0001-7574

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.67	5	12/12/12	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	99.3	99%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	97.3	97%	85-115%	

LABORATORY SAMPLE DUPLICATE 12-7574

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	174.9	177.9	102%	85-115%	

pH SM4500-H+F

Results	QC Limits	Lab Standard Number
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ICV Buffer 7.00 7.02 6.95-7.05 L11-0002-0121

ICV Buffer 4.00 4.01 3.95-4.05 L12-0002-0046

ICV Buffer 10.01 10.04 9.96-10.06 L12-0002-0047

CCV Buffer 10.00 10.11 9.96-10.06 L11-0002-0122

CCV Buffer 4.05 4.02 3.95-4.05 L12-0002-0048

Slope 97.4% 90-102%



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAF 300.0

METHOD BLANK MATRIX: Water

Associated Lab Samples: L12-0001-7574

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	12/07/12	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 12-7574	mg/l	8.6	4	12.3	93%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Qualifiers
Sulfate	mg/l	5	4.6	92%	85-115	



QUALIFIERS

Quentin J. Schmidt Analytical Laboratory

43 Iron County Road No 1 Bldg 3

Viburnum, MO 65566

(573) 244-8105

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
:	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

H Analysis conducted outside the EPA method holding time.

M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	MM
IC	TLL

Report Acceptance	
QAO	Date
GWP	12/13/2012
Manager	Date
EJS	12/13/2012

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
12/14/12	12-7703	RMP ROUGH T	2.3 J	8798^	1.6	ND	439	28	1065^	189	740	7.15	5
		RMP ROUGH D		8156^					810				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L12-0001-7703

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.09	0.38	12/17/12	
Copper	ug/L	4.4	0.97	12/17/12	
Lead	ug/L	0.73	2.7	12/17/12	
Zinc	ug/L	0.17	0.91	12/17/12	
Nickel	ug/L	ND	0.86	12/17/12	
Thallium	ug/L	ND	1.86	12/17/12	
Iron	ug/L	5.2	2.0	12/17/12	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	497	99%	85-115%	
Copper	ug/L	500	485	97%	85-115%	
Lead	ug/L	500	501	100%	85-115%	
Zinc	ug/L	500	497	99%	85-115%	
Nickel	ug/L	500	489	98%	85-115%	
Iron	ug/L	500	460	92%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-7703 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.0005	500	500	559	582	112%	116%	75-125%	
Copper	ug/L	2	500	500	485	471	97%	94%	75-125%	
Lead	ug/L	1.6	500	500	515	527	103%	105%	75-125%	
Zinc	ug/L	88	500	500	665	682	115%	119%	75-125%	
Nickel	ug/L	4.7	500	500	488	490	97%	97%	75-125%	
Iron	ug/L	11	500	500	437	442	85%	86%	75-125%	



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L12-0001-7703

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.95	5	12/18/12	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	96.5	97%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	97	97%	85-115%	

LABORATORY SAMPLE DUPLICATE 12-7703

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	189.1	187.1	99%	85-115%	

pH SM4500-H+E	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.00	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.04	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.00	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.03	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	3.99	3.95-4.05	L12-0002-0048
Slope	95.1%	90-102%	



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAF 300.0

METHOD BLANK MATRIX: Water

Associated Lab Samples: L12-0001-7703

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	12/17/12	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 12-7703	mg/l	7.4	4	11.5	103%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.3	86%	85-115		



QUALIFIERS

Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
Filter	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

- H** Analysis conducted outside the EPA method holding time.
M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	MM
IC	TLL

Report Acceptance	
QAO	Date
GWP	12/20/2012
Manager	Date
EJS	12/20/2012

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
12/17/12	12-7762	RMP ROUGH T	4.3	7607^	ND	0.37 J	448	24	1990^	188	791	7.15	6
		RMP ROUGH D		7029^					666^				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L12-0001-7762

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.09	0.38	12/18/12	
Copper	ug/L	ND	0.97	12/18/12	
Lead	ug/L	ND	2.7	12/18/12	
Zinc	ug/L	0.02	0.91	12/18/12	
Nickel	ug/L	0.21	0.86	12/18/12	
Thallium	ug/L	ND	1.86	12/18/12	
Iron	ug/L	ND	2.0	12/18/12	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	495	99%	85-115%	
Copper	ug/L	500	493	99%	85-115%	
Lead	ug/L	500	497	99%	85-115%	
Zinc	ug/L	500	496	99%	85-115%	
Nickel	ug/L	500	494	99%	85-115%	
Iron	ug/L	500	491	98%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-7762 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.2	500	500	492	487	98%	97%	75-125%	
Copper	ug/L	0	500	500	500	496	100%	99%	75-125%	
Lead	ug/L	0	500	500	494	488	99%	98%	75-125%	
Zinc	ug/L	76	500	500	570	564	99%	98%	75-125%	
Nickel	ug/L	5.7	500	500	492	487	97%	96%	75-125%	
Iron	ug/L	20	500	500	514	500	99%	96%	75-125%	



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L12-0001-7762

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.95	5	12/17/12	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	96.49	96%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	96.97	97%	85-115%	

LABORATORY SAMPLE DUPLICATE 12-7762

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	187.6	187.1	100%	85-115%	

pH SM4500-H+E	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.00	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.04	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.00	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.03	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	3.99	3.95-4.05	L12-0002-0048

Slope 95.1% 90-102%



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAF 300.0

METHOD BLANK MATRIX: Water

Associated Lab Samples: L12-0001-7762

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	12/18/12	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 12-7762	mg/l	7.9	4	12.2	108%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Qualifiers
Sulfate	mg/l	5	4.6	92%	85-115	



QUALIFIERS

Quentin J. Schmidt Analytical Laboratory

43 Iron County Road No 1 Bldg 3

Viburnum, MO 65566

(573) 244-8105

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
Λ	1/100 Dilution
Filter	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

H Analysis conducted outside the EPA method holding time.

M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	MM
IC	TLL

Report Acceptance	
QAO	Date
GWP	12/20/2012
Manager	Date
EJS	12/20/2012

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
12/19/12	12-7814	RMP ROUGH T	3.4	10040^	11.3	ND	463	29	2306^	179	776	7.32	5
		RMP ROUGH D		9100^					1573				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L12-0001-7814

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	12/20/12	
Copper	ug/L	ND	0.97	12/20/12	
Lead	ug/L	0.14	2.7	12/20/12	
Zinc	ug/L	0.98	0.91	12/20/12	
Nickel	ug/L	ND	0.86	12/20/12	
Thallium	ug/L	2.1	1.86	12/20/12	
Iron	ug/L	14	2.0	12/20/12	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	505	101%	85-115%	
Copper	ug/L	500	490	98%	85-115%	
Lead	ug/L	500	494	99%	85-115%	
Zinc	ug/L	500	506	101%	85-115%	
Nickel	ug/L	500	489	98%	85-115%	
Iron	ug/L	500	512	102%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-7814 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0	500	500	570	564	114%	113%	75-125%	
Copper	ug/L	3.9	500	500	473	454	94%	90%	75-125%	
Lead	ug/L	0	500	500	502	492	100%	98%	75-125%	
Zinc	ug/L	100	500	500	691	684	118%	117%	75-125%	
Nickel	ug/L	5.2	500	500	502	500	99%	99%	75-125%	
Iron	ug/L	23	500	500	450	440	85%	83%	75-125%	



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Viburnum, MO 65566
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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L12-0001-7814

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.87	5	1/3/13	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	95.33	95%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	93.4	93%	85-115%	

LABORATORY SAMPLE DUPLICATE 12-7814

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	178.9	183.8	103%	85-115%	

pH SM4500-H+E	Results	QC Limits	Lab Standard Number
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ICV Buffer 7.00	6.96	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	3.99	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	9.96	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	9.98	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	3.98	3.95-4.05	L12-0002-0048

Slope	98.4%	90-102%
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43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAF 300.0

METHOD BLANK MATRIX: Water

Associated Lab Samples: L12-0001-7814

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	12/19/12	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 12-7814	mg/l	7.8	4	10.9	78%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.4	88%	85-115		



QUALIFIERS

Quentin J. Schmidt Analytical Laboratory

43 Iron County Road No 1 Bldg 3

Viburnum, MO 65566

(573) 244-8105

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
Filterd	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

H Analysis conducted outside the EPA method holding time.

M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	MM
IC	TLL

Report Acceptance	
QAO	Date
GWP	1/4/2013
Manager	Date
EJS	1/4/2013

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
12/27/12	13-0195	RMP ROUGH T	8.7	11170^	0.83 J	0.23 J	587	32	1910	172	831	7.3	17
		RMP ROUGH D		10630^					1386				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L13-0001-0195

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	1/9/13	
Copper	ug/L	ND	0.97	1/9/13	
Lead	ug/L	ND	2.7	1/9/13	
Zinc	ug/L	ND	0.91	1/9/13	
Nickel	ug/L	ND	0.86	1/9/13	
Thallium	ug/L	ND	1.86	1/9/13	
Iron	ug/L	ND	2.0	1/9/13	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	497	99%	85-115%	
Copper	ug/L	500	506	101%	85-115%	
Lead	ug/L	500	496	99%	85-115%	
Zinc	ug/L	500	500	100%	85-115%	
Nickel	ug/L	500	499	100%	85-115%	
Iron	ug/L	500	509	102%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-0195 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0	500	500	537	543	107%	109%	75-125%	
Copper	ug/L	0	500	500	506	511	101%	102%	75-125%	
Lead	ug/L	1.1	500	500	501	505	100%	101%	75-125%	
Zinc	ug/L	112	500	500	670	674	112%	112%	75-125%	
Nickel	ug/L	7.2	500	500	508	515	100%	102%	75-125%	
Iron	ug/L	12	500	500	498	536	97%	105%	75-125%	



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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L13-0001-0195

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.97	5	1/9/13	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	98.6	99%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	97.1	97%	85-115%	

LABORATORY SAMPLE DUPLICATE 13-0195

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	171.6	171.1	100%	85-115%	

pH SM4500-H+E	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	6.96	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.02	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.06	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.06	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	4.02	3.95-4.05	L12-0002-0048
Slope	98.7%	90-102%	



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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

METHOD BLANK MATRIX: Water

Associated Lab Samples: L13-0001-0195

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	1/10/13	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 13-0195	mg/l	8.3	4	12	93%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.5	90%	85-115		



Quentin J. Schmidt Analytical Laboratory

43 Iron County Road No 1 Bldg 3

Viburnum, MO 65566

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QUALIFIERS**SEMO PROJECT****DEFINITIONS**

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
FF	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS**H** Analysis conducted outside the EPA method holding time.**M** Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.**R** RPD value was outside control limits.**NES** Not enough sample.

Method	Analysts
200.7	TLL
Alka	AH
IC	TLL

Report Acceptance	
QAO	Date
GWP	1/11/2013
Manager	Date
EJS	1/11/2013